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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/944,203	09/04/2001	Hitoshi Moriya	Q66101	1194

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EXAMINER	
AHMED, SALMAN	
ART UNIT	**PAPER NUMBER**
2666	

DATE MAILED: 06/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/944,203	MORIYA, HITOSHI
	Examiner	Art Unit
	Salman Ahmed	2666

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 September 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 September 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/17/03*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1, 4, 6-10, 12, 14, 17 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Perlman (US PAT 5079767).

Regarding claim 1, 6, 14 and 18: A routing control system or a routing controller having a method for use in a network having a plurality of nodes is anticipated by network having a plurality of communication nodes (column 5 line 62), said nodes including a single master node and at least one slave node is anticipated by network consisting of communication nodes which are either "intermediate system" nodes or "end system" nodes (column 5 line 66), said routing control system comprising: a spanning tree producing portion provided in said master node for producing a spanning tree of said network on the basis of connection information of said network to deliver said spanning tree to each slave node whenever said connection information is received is anticipated by the step of decision process being responsible for calculating a spanning tree using Dijkstra's algorithm determining the routing forwarding data base

stored in forwarding data base (column 8 line 52 and figure 3), a memorizing portion provided in each of said nodes for memorizing said spanning tree delivered from said spanning tree producing portion as a routing table is anticipated by node data base storage which includes a RAM containing tables or data bases, such as a routing forwarding data base. The routing forwarding data base contains a table correlating different destination node addresses to corresponding links to be used to transmit messages to those nodes (column 7 lines 28-34), and a health check portion provided in each of said nodes for sending said connection information to said spanning tree producing portion when topology change of said network Is detected is anticipated by the step of determining which neighboring nodes are currently active, each node continually transmitting "hello" messages along the links with which it is connected and receiving "hello" messages from active nodes connected to these links (column 7 line 52), and further anticipated by the update process being responsible for maintaining link state packet data base in storage, and for forwarding notification of a change in the neighbors ("neighbor event") or any of the link state packets in link state packet data base to decision process (column 8 line 21 and figure 3).

__Regarding claim 4 and 17:__ Spanning tree producing portion uses the Dïlkstra algorithm to make said spanning tree is anticipated in column 3 lines 3-9 by Perlman. Perlman states that an example of calculation which is discussed in A. V. Aho, J. E. Hopcraft, J. D. Ullman, Data Structures and Algorithms, Addison-Wesley, Reading,

Mass., 1983, Dijkstra's algorithm, and which is herein incorporated by reference, is the creation of a least cost "spanning tree."

Regarding claim 7: Health check portion of any slave node transmitting a message signal to said health cheek portion of said master node when the fault is detected. wherein said health check portion of said master node broadcasts a request signal on said network when said message signal is received. said health check portion of each slave node sending said connection information to said spanning tree providing portion in response to said request signal is anticipated by the step of update process being responsible for maintaining link state packet data base in storage, and for forwarding notification of a change in the neighbors ("neighbor event") or any of the link state packets in link state packet data base to decision process. Then Perlman states (column 8 line 45-55) that if no "hello" message is received from a previously active node for a given period of time, a neighbor event notifies update process to delete the neighbor from the node's link state packet. When the local link state changes or when update process detects a variation in the link state packet data base update process notifies decision process. Decision process is responsible for calculating a spanning tree using Dijkstra's algorithm to determine the routing forwarding data base stored in forwarding data base.

Regarding claim 8: Heath check portion detects that an additional node is directly connected to the node thereof with referring to said routing table memorized in said

memorizing portion of the node thereof to detect said topology change of said network is anticipated during the process of generating local link status, update process adds neighbors to and deletes neighbors from the node's link state packet in response to a neighbor event. If a "hello" message is received from a previously inactive link, a neighbor event notifies update process to add the node which generated the "hello" message to the list of neighbors in the link state packet (column 8 line 37).

Regarding claim 9: Health check portion of any slave node transmitting a message signal to said health check portion of said master node when the additional node is detected wherein said health cheek portion of said master node broadcasts a request signal on said network when said message signal is received, said health cheek portion of each slave node sending said connection Information to said spanning tree producing portion In response to said request signal is anticipated by the step of update process being responsible for maintaining link state packet data base in storage, and for forwarding notification of a change in the neighbors ("neighbor event") or any of the link state packets in link state packet data base to decision process. Perlman adds (column 8 line 30) that update process receives link state packets and neighbor events from receive process. A neighbor event is a notification from a subnetwork layer process that a neighbor has been added or deleted (column 8 line 21). Perlman further states If a "hello" message is received from a previously inactive link, a neighbor event notifies update process to add the node which generated the "hello" message to the list of neighbors in the link state packet (column 8 line 40). Finally Perlman states when the local link state changes or when update process

detects a variation in the link state packet data base update process notifies decision process. Decision process is responsible for calculating a spanning tree using Dijkstra's algorithm to determine the routing forwarding data base stored in forwarding data base (column 8 line 48-55).

Regarding claim 10 and 12: Health check portion of each slave node having a plurality of ports directly connected to adjacent nodes, wherein said health check portion of each slave node receives said request signal at one of ports and transmits it from the remaining ports to said adjacent nodes and health check portion memorizes a port number of said port receiving said request signal to produce said connection information is anticipated by forwarding process determining, from the receive process, on which link the multicast message was originally received. The multicast message is then forwarded along all the links in a multicast neighbor list, such as the level 1 multicast neighbor list, except the link on which the message was received. The level 1 multicast neighbor list is the list of all the links correlated to the neighbors in the level 1 multicast spanning tree (column 13 lines 11-19). Perlman is talking of getting information about the original link, which received the message. Since port is inherent in a link, i.e. nodes are connected to each other via physical ports or links, it is understood that link and port can be described as nothing but output interfaces. Further the link/port information is saved in order to retrieve it for processing at later time.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 2 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perlman (US PAT 5079767), as applied to claim 1 and 14 above and further in view of Meier et al (US PAT 6826165), hereinafter referred to as Meier.

Perlman discloses in column 5 lines 62 and 63 about network having a plurality of communication nodes.

Perlman does not state the nodes being base stations and connection between base stations and computers being radio.

Meier discloses in column 1 line 5-7 that the RF data communication system contains one or more host computers and multiple gateways, bridges, and RF terminals. In column 1 lines 29-32 Meier states about earlier RF (Radio Frequency) data communication systems, the base stations were typically connected directly to a host computer through multi-dropped connections to an Ethernet communication line. In column 3 line 1 Meier states the gateway (the spanning tree root node) may be part of host computer. Then in column 3 line 48-50 Meier adds packets can be broadcast using known methods of communicating via radio frequency (RF) link or via a direct wire link.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Perlman's teaching to incorporate Meier teaching of having wireless connections between base station and the computer. The motivation being that it is cheaper in terms of money and real estate to have a wireless connection. It also makes the computers mobile within the range of the wireless network.

4. Claims 3 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perlman (US PAT 5079767) as applied to claims 1 and 14 above, and further in view of Lee (US PAT 6122283).

Perlman teaches of using Dijkstra algorithm to produce spanning tree. Perlman states in column 3 lines 3-9 of a link state packets being primarily used for calculation of pathways through the network. One example of such a calculation which is discussed in A. V. Aho, J. E. Hopcraft, J. D. Ullman, Data Structures and Algorithms, Addison-Wesley, Reading, Mass., 1983, Dijkstra's algorithm, and which is herein incorporated by reference, is the creation of a least cost "spanning tree."

Perlman does not mention of spanning tree can be represented as undirected graph of graph theory.

Lee discloses in column 2 lines 31-37 about a publication "Data Networks", Dimitri Bertsekas & Robert Gallager, Prentice Hall, 1987 (pg. 322-325) which describes of two well known shortest path algorithms, or methodologies, which can be used to generate a shortest path between each pair of border switching nodes in a peer group, thereby

obtaining, for the peer group, topology representation in the form of a full mesh graph spanning the border switching nodes.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Perlman's teachings to incorporate Lee's teachings of representing the spanning tree as an undirected graph of graph theory. The motivation is that such representation helps to visualize the network topology very easily.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Perlman (US PAT 5079767) as applied to claim 1 above, and further in view of Tsukakoshi (US PAT 6496510) and Ma (US PAT APPLICATION PUB US 2005/0083936).

Perlman discloses in column 7 lines 31-34 about routing forwarding data base contains a table correlating different destination node addresses to corresponding links to be used to transmit messages to those nodes. This table contains the results of the spanning tree algorithm

Perlman does not mention specific elements of the table explicitly.

Tsukakoshi discloses of a link status table and a routing table in figure 4 and figure 5 which are jointly used to make routing decisions.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Perlman's teaching of routing table to be incorporated with the elements of Tsukakoshi's link status table and routing table. The motivation is that such information are useful for routing of ip packets via ip routing scheme and all the necessary information will be available from the same table during routing time.

Perlman and Tsukakoshi disclose of routing and status tables being stored and used for routing purpose. Perlman and Tsukakoshi do not mention port to be a specific element of the tables.

Ma explains in his teachings in column 2 section [0020] about when the packet protocol is determined to one that can be routed (e.g., if it is an IP packet), the router first performs housekeeping functions known to those of ordinary skill in the art, and then the router "looks up" the destination IP address in its routing table to identify the appropriate router output interface (also called a "port") on which to transmit the received packet.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Perlman and Tsukakoshi's teaching of routing/status table to be incorporated with Ma's port info. The motivation is that port information is needed for routing of ip packets via ip routing scheme. It is known in the ordinary skill of art that in ip protocol, routing is done based on ip address which is associated with a port and status of the link. Without these information routing will not be efficiently achieved in ip domain using ip routing.

6. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Perlman (US PAT 5079767), as applied to claim 10 above, and further in view of Sepulveda-Garese et al (US PAT 5430730), hereinafter referred to as of Sepulveda-Garese.

Perlman states in column 2 lines 60-68 that one mechanism for inter-node communication, each node prepares a packet of information designated as a "link state

packet." The link state packet contains, inter alia, the address of the node preparing the packet, the neighbors of the node preparing the packet, and information concerning each link with that node's corresponding neighbors. All of the directly communicating nodes in a group collect these link state packets from other nodes in the group and make a list of the nodes and their associated status information.

Perlman does not teach how nodes can avoid redundant packets.

Sepulveda-Garese describes how ID may be used to identify redundant messages. Sepulveda-Garese teaches in column 9 line 63 about how all currently connected nodes on the LAN receives and validates the NODE-UP message. For example, nodes that belong to other sub-networks but are physically connected to the same LAN, will have a different LAN-ID and discard the message as not intended for them; nodes that belong to no sub-networks will also discard the message. When the broadcast is received by the node that sent it, it also is discarded.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Perlman's teaching to incorporate ID in messages as taught by Sepulveda-Garese. The motivation is that using ID, the network nodes can identify messages intended for them easily and accurately and not process messages not intended for them.

7. Claims 13 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perlman (US PAT 5079767) as applied to claim 1 and 18 above, and further in view of Green (US PAT 5517494).

Perlman teaches of a node using a method that checks the status of the network. In column 7 line 52 Perlman states that in order to determine which neighboring nodes are currently active, each node continually transmits "hello" messages along the links with which it is connected and receives "hello" messages from active nodes connected to these links. The process of determining the neighbors of a node is managed by processes in subnetwork layers which pass the information up to the network layer.

Perlman does not teach that the said process in the node notifies the routing table entity to change its state due to change in topology.

Green teaches how routing table states are modified when topology change is detected. Green teaches in column 10 lines 11 if adjacent nodes are not heard from for a configured interval then their state is changed to non operational and the network route table 95 is examined. The state for every range in the network route table 95 for which one of these adjacent nodes is the next hop is changed to unreachable.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Perlman's teaching to incorporate Green's teaching in triggering state change in a routing table. The motivation is that such a change can be used to trigger routing table update right away instead of waiting for some other process or method to trigger the update.

References pertinent to the art but not used in the office action are as follows:

1) US PAT 5732072 Thanner et al. Method for adaptive routing in a communication network

2) US PAT 6393026 Irwin Data packet processing system and method for a router
3) US PAT 6847614 Banker et al. Apparatus and method for unilateral topology discovery in network management
4) US PAT 6633544 Rexford et al. Efficient precomputation of quality of service routes
5) US PAT 6041049 Brady Method and apparatus for determining a routing table for each node in a distributed nodal system
6) US PAT PUB 2002/0080798 Hariguchi et al. Network routing table and packet routing method
7) US PAT 6760314 Iwata Network load distribution system and network load distribution method
8) US PAT 5649108 Spiegel et al. Combined progressive and source routing control for connection-oriented communications networks
9) US PAT PUB 2002/0044549 Johansson Efficient Scatternet forming
10) US PAT 6831896 Lempio et al. Short range RF network

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Salman Ahmed whose telephone number is (571)272-8307. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on (571)272-3174. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Seema S. Rao 5/31/05
SEEMA S. RAO
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